Short Title: Road Traffic Injuries
Full Title: Annual number of fatal and severe road traffic injuries per population and per miles traveled by transport mode

1. **Healthy Community Framework:** Meets basic needs of all

2. **What is our aspirational goal:** Safe, sustainable, accessible and affordable transportation options

3. **Why is this important to health?**

Transportation accidents are the second leading cause of death in California for people under the age of 45 and account for an average of 4,018 deaths per year (2006-2010). Risks of injury in traffic collisions are greatest for motorcyclists, pedestrians, and bicyclists and lowest for bus and rail passengers. Minority communities bear a disproportionate share of pedestrian-car fatalities; Native American male pedestrians experience 4 times the death rate as Whites or Asians, and African-Americans and Latinos experience twice the rate as Whites or Asians.

Key References

- Chang D. *National pedestrian crash report*. Washington, DC: National Center for Statistics and Analysis, National Highway Traffic Safety Administration, U.S. Department of Transportation; 2008. Report No.: DOT HS 810 968. Accessed October 27, 2013.
- Beck LF, Dellinger AM, O'Neil ME. Motor vehicle crash injury rates by mode of travel, United States: Using exposure-based methods to quantify differences. *Am J Epidemiol* 2007; 166(2):212-218.
- Leaf WA, Preusser DF. *Literature review on vehicle travel speeds and pedestrian injuries*. National Highway Traffic Safety Administration, U.S. Department of Transportation; 1999. Report No.: DOT HS 809 021. Accessed October 27, 2013.
- California Department of Public Health. *Vital Statistics Query System*, 2006-2010. Accessed October 27, 2013.
- Naumann RB, Beck LF. Motor vehicle traffic-related pedestrian deaths – United States, 2001-2010. *MMWR* 2013; 62(15): 277-282.

4. **What is the indicator?**

Detailed Definition: Annual number of fatal and severe road traffic injuries 1) per population and 2) per miles traveled by transport mode

- Stratification: victim mode of transport (Bicyclist, Bus, Car/Pickup, Motorcycle, Pedestrian, Truck, Vehicles), severity of injury (fatal, severe)

Data Description

- Data sources:
  Numerator: Statewide Integrated Traffic Records System (SWITRS), California Highway Patrol (CHP), 2002-2010 data from the Transportation Injury Mapping System (TIMS) (http://www.tims.berkeley.edu). Denominator 1: Historical Population and Housing Estimates for Cities, Counties, and the State, 2000-2010, Demographic Research Unit, Department of Finance (DOF) (http://www.dof.ca.gov/research/demographic/reports/estimates/e-8/2000-10/view.php). U.S. Census Bureau, 2006-2010 American Community Survey (http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml). Denominator 2: California Public Road data (CPR); Division of Research, Innovation and System Information; Office of Highway System Information & Performance; Highway Performance Monitoring System; California Department of Transportation http://www.dot.ca.gov/hq/tsip/hpms/datalibrary.php).

U.S. Department of Transportation, Federal Highway Administration, 2009 National Household Travel Survey (NHTS) (http://nhts.ornl.gov). All data accessed 7/2013.

- Years available: 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2002-2004, 2005-2007, 2008-2010, 2006-2010.
- Updated: 1, 3, and 5 year intervals
- Geographies available: census tracts, cities/towns, counties, regions, consolidated metropolitan statistical areas (CMSA), and state

Numerator: Collision data for severe and fatal injuries occurring between 2002 and 2010 were downloaded from TIMS and geocoded to the 2010 U.S. census tracts and places. Specific coordinates within counties were not reported for 7.7% of injuries, which could not be geocoded to a specific city or census tract. CHP defines severe injuries as those other than fatal injuries that include the following: broken or fractured bones; dislocated or distorted limbs; severe lacerations; skull, spinal, chest or abdominal injuries that go beyond other visible injuries; unconsciousness at or when taken from collision scene; and severe burns. Fatal injuries are deaths from collisions occurring within 30 days after the collision date. Victim mode of transport was classified into 6 groups: car/pickup, truck, bus, motorcycle, pedestrian, and bicyclist. Denominator 1: annual total population for 480 incorporated cities, counties, and California from 2002 to 2010 was acquired from DOF. Three-year population averages were calculated for 2002-2004, 2005-2007, and 2008-2009. Total population counts for census tracts and 1043 census designated places for the period 2006-2010 were obtained from the American Community Survey. Denominator 2: Daily vehicle miles traveled for cities, counties, and California from 2002 to 2010 was abstracted from CPR and multiplied by 365 to estimate annual vehicle miles traveled. Annual miles traveled by bicyclists and pedestrians for CMSAs (county clusters for major metropolitan areas) and California was estimated between 2002 and 2010 from the NHTS by applying the annual rate of change between 2001 and 2009. Three and five-year averages were calculated. Indicator: the rate of collisions was calculated as injuries (severe or fatal) per 100,000 people (denominator 1) and injuries (severe or fatal) per 10^9 miles traveled (denominator 2), for each of the 6 victim modes of transport. The standard error was calculated as: $rate/\sqrt{injuries}$. Relative standard errors, 95% confidence intervals, and decile ranking of places were also calculated. Regions were based on counties of metropolitan transportation organizations as reported in the *2010 California Regional Progress Report*.

5. Strengths and limitations

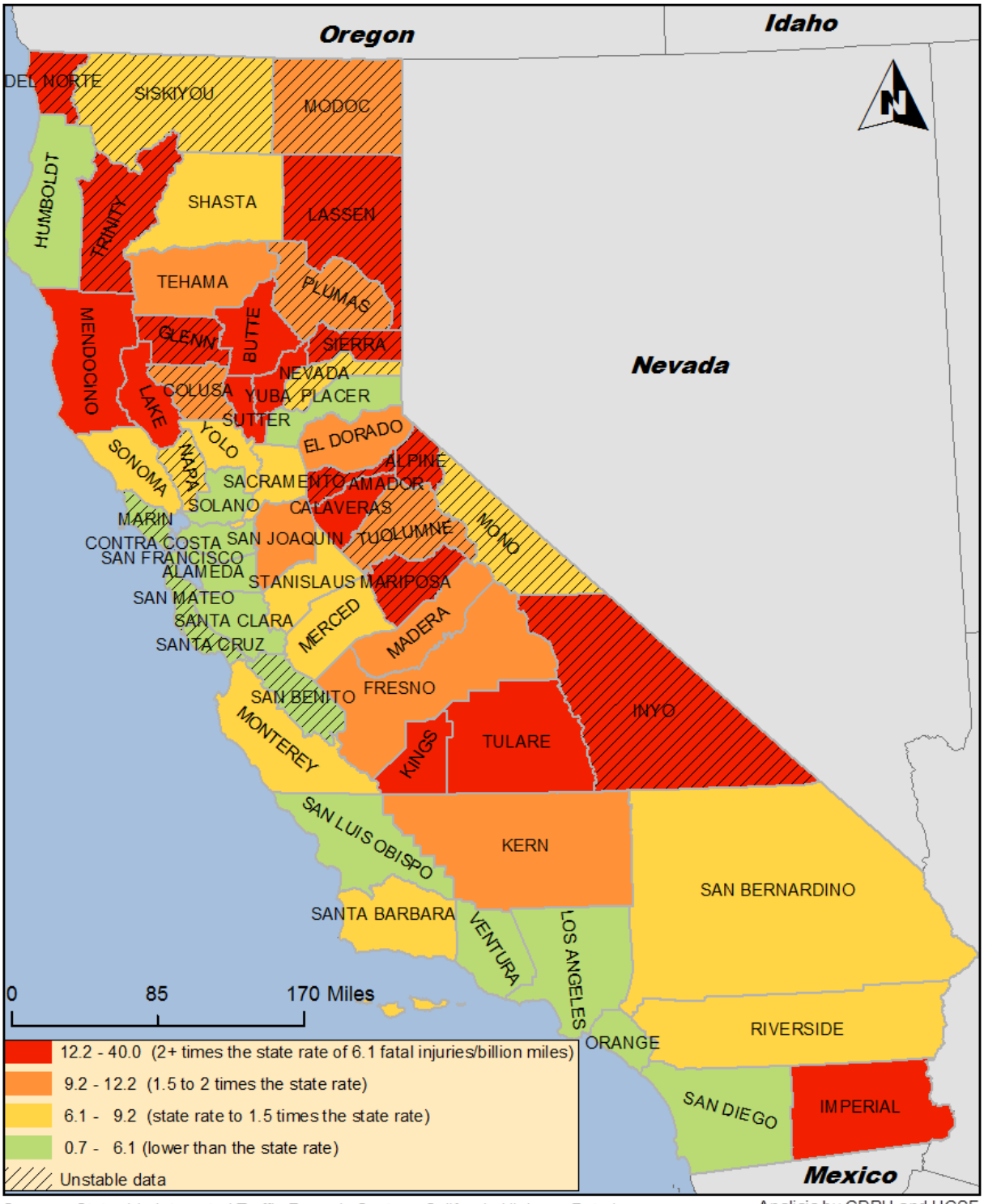
SWITRS provides information on injury occurrence for census tracts and cities, geographies not currently available from death certificates or data on hospitalizations or emergency room visits. SWITRS undercounts “non-traffic” injuries that occur off of public roads. The occurrence of the injury may not match the geography where the victim resides, although this discrepancy decreases at larger geographic units (counties, states). Compared to death certificates and hospitalizations, SWITRS is known to undercount both fatal and severe injuries. This may be especially true for victims that are low income, do not have health insurance, or are undocumented. Furthermore, collision data do not address disability and mental health impacts or economic losses.

6. Projects using this indicator

1. San Francisco Department of Public Health. Sustainable Communities Index. San Francisco, CA: San Francisco Department of Public Health; 2013. http://www.sustainablecommunitiesindex.org/city_indicators/view/19.
2. Community Indicators Victoria. Community Indicators Victoria: Data Framework. Community Indicators Victoria; 2011. http://www.communityindicators.net.au/ data_framework

7. Examples of Maps, Figures, and Tables

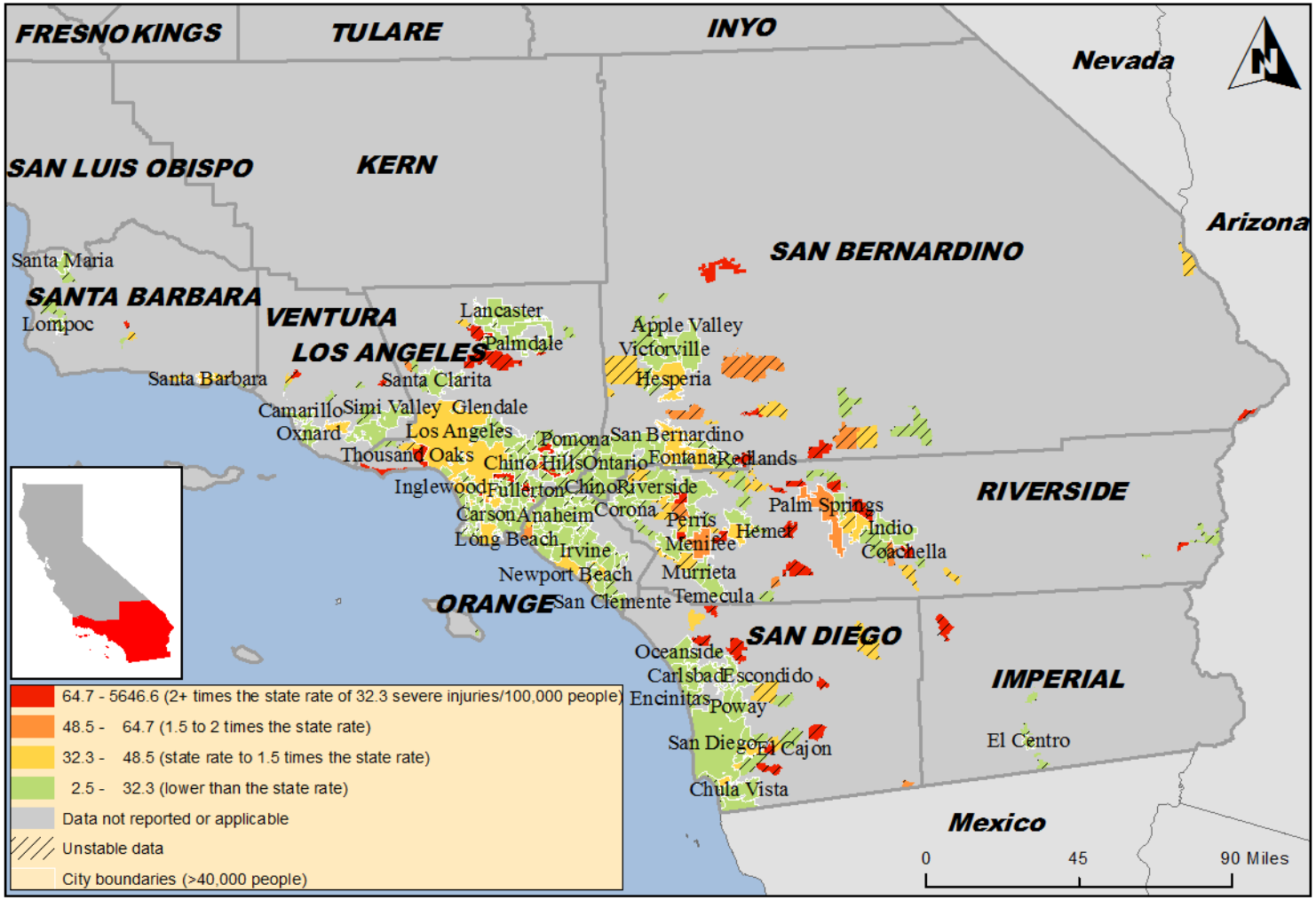
Map 1. Annual Number of Fatal Road Traffic Injuries per Billion Miles Traveled in Motorized Vehicles, Counties, California, 2010



Sources: Statewide Integrated Traffic Records System, California Highway Patrol.
California Public Road data, California Department of Transportation.

Analisis by CDPH and UCSF

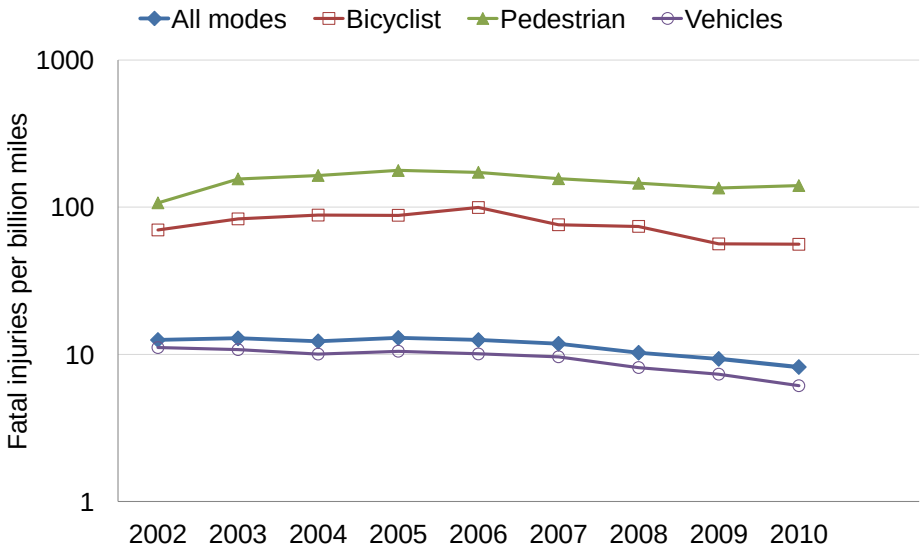
Map 2. Number of Severe Road Traffic Injuries per 100,000 People
Cities/towns, Southern California, 2006-2010



Sources: Statewide Integrated Traffic Records System, California Highway Patrol.
Demographic Research Unit, Department of Finance. Note: 2006-2010 is a five year average.

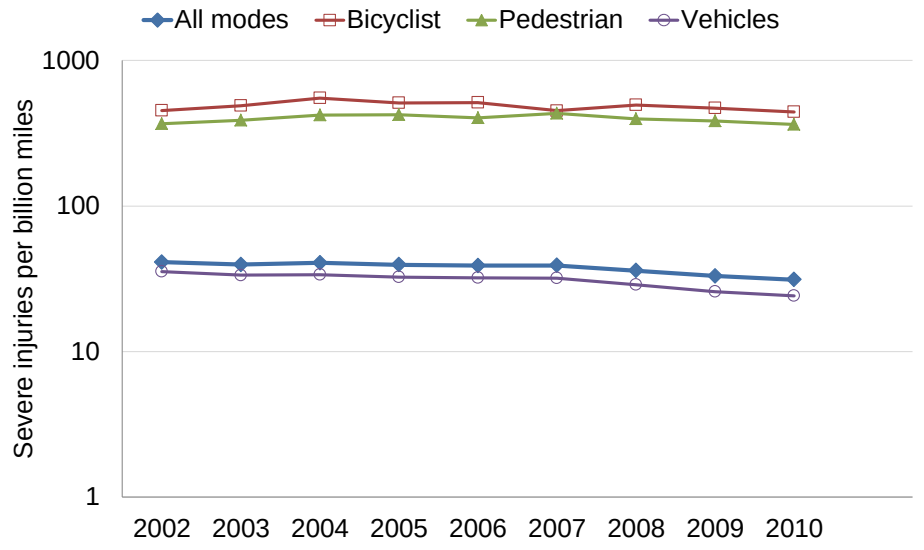
Analysis by CDPH and UCSF

Annual Number of Fatal Road Traffic Injuries per Billion Miles Traveled by Mode, California, 2002-2010



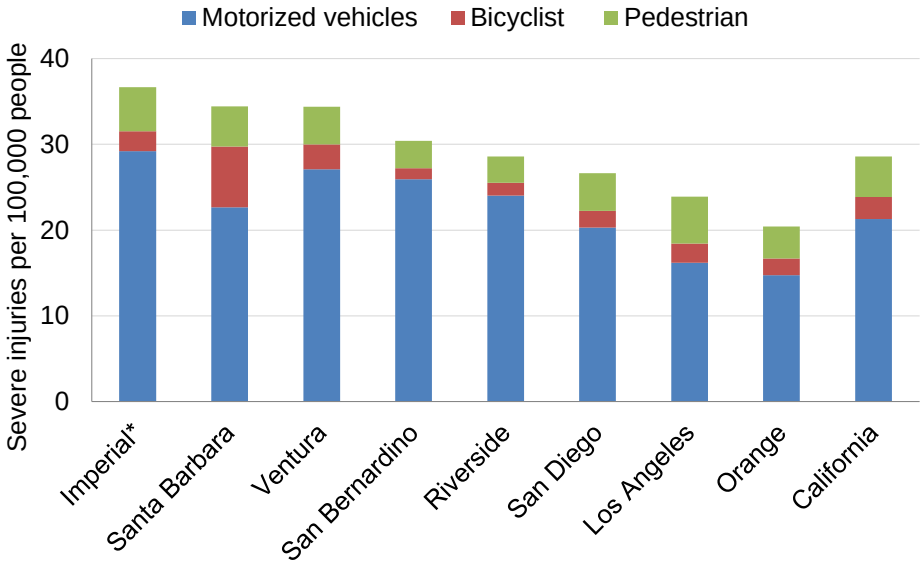
Sources: Statewide Integrated Traffic Records System, California Highway Patrol. California Public Road data, California Department of Transportation. U.S. Department of Transportation, 2009 National Household Travel Survey

Annual Number of Severe Road Traffic Injuries per Billion Miles Traveled by Mode, California, 2002-2010



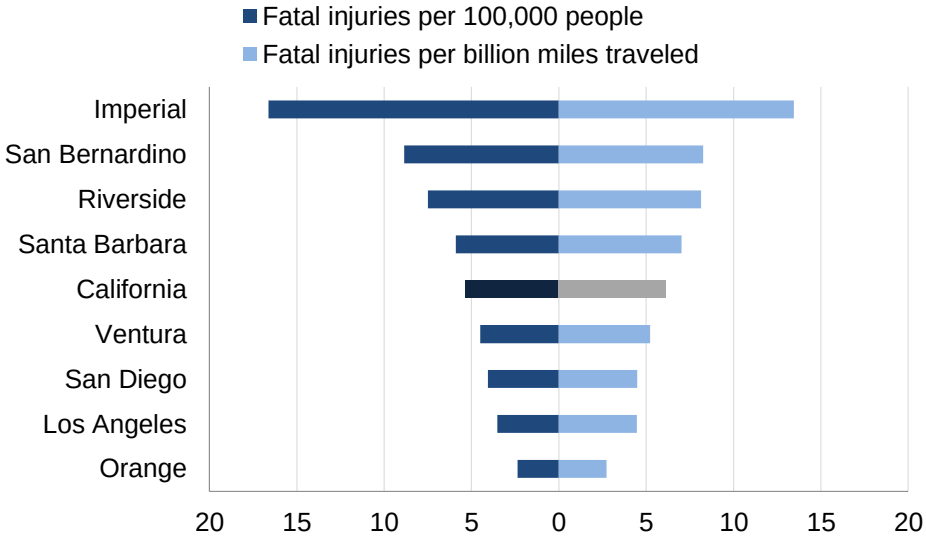
Sources: Statewide Integrated Traffic Records System, California Highway Patrol. California Public Road data, California Department of Transportation. U.S. Department of Transportation, 2009 National Household Travel Survey

Annual Number of Severe Road Traffic Injuries per 100,000 People by Transport Mode Southern California, 2010



Source: Statewide Integrated Traffic Records System, California Highway Patrol. Demographic Research Unit, Department of Finance. *Pedestrian data is unstable.

Annual Number of Fatal Road Traffic Injuries Victim Mode of Transport: Motorized Vehicles Southern California, 2010



Source: Statewide Integrated Traffic Records System, California Highway Patrol. Demographic Research Unit, Department of Finance. California Public Road data, California Department of Transportation.

Table 1. Three-Year Annual Average Number of Severe Road Traffic Injuries per 100,000 People, Cities/towns, Orange County, 2002-2004 and 2008-2010

	2002-2004			2008-2010		
City/Town	Severe injuries	Population	Injuries per 100,000 people	Severe injuries	Population	Injuries per 100,000 people
Aliso Viejo	5	44,455	11[a]	3	47,115	7[a]
Anaheim	77	331,706	23	72	333,940	21
Brea	15	37,845	39	6	39,154	15[a]
Buena Park	24	78,870	31	15	80,114	18
Costa Mesa	29	109,396	27	30	109,510	28
Cypress	7	47,270	15[a]	6	47,646	13[a]
Dana Point	9	34,940	26[a]	9	33,449	28[a]
Fountain Valley	17	55,101	31	8	55,139	15[a]
Fullerton	21	131,064	16	18	134,617	13
Garden Grove	34	168,144	20	31	170,040	18
Huntington Beach	38	192,637	20	28	190,050	15
Irvine	62	166,744	37	60	209,096	29
La Habra	10	60,081	16	8	60,114	13[a]
La Palma	-	-	-	5	15,531	34[a]
Laguna Beach	11	23,701	48	11	22,793	50
Laguna Hills	11	31,734	34[a]	13	30,455	44
Laguna Niguel	14	63,399	22	12	62,907	19
Laguna Woods	1	17,336	6[a]	1	16,222	4[a]
Lake Forest	17	76,637	23	19	76,991	24
Los Alamitos	3	11,554	29	5	11,455	47[a]
Mission Viejo	15	96,199	16	24	93,438	26
Newport Beach	41	79,623	52	28	84,563	33
North Tustin	4	-	-	3	-	-
Orange	39	132,898	29	31	135,818	23
Placentia	9	48,656	18[a]	-	-	-
Rancho Santa Margarita	4	48,017	8[a]	5	47,795	10[a]
Rossmoor	-	-	-	1	-	-
San Clemente	20	59,691	34	16	63,491	25
San Juan Capistrano	8	34,469	22[a]	8	34,512	24[a]
Santa Ana	72	335,791	22	63	324,979	19
Seal Beach	14	24,326	56	12	24,029	50
Stanton	12	37,803	31	10	38,020	25[a]
Sunset Beach	1	-	-	-	-	-
Tustin	17	69,645	25	21	74,738	29
Westminster	19	89,152	21	13	89,296	15
Yorba Linda	13	61,344	22	4	63,909	6[a]
Orange County	733	2,934,927	25	639	2,997,542	21
California	13,354	35,343,934	38	11,099	37,061,602	30

Sources: Statewide Integrated Traffic Records System, California Highway Patrol. Demographic Research Unit, Department of Finance.

[a] Not statistically reliable (relative standard error exceeds 30%).

- Data is not available